

ON SCHUR 3-GROUPS

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Let G be a finite group. An S -ring \mathcal{A} over G is a subring of the group ring $\mathbb{Z}G$ that has a linear basis associated with a special partition of G . About 40 years ago R. Pöschel suggested the problem which can be formulated as follows: for which group G every S -ring \mathcal{A} over it is schurian, i.e. the partition of G corresponding to \mathcal{A} consists of the orbits of the one point stabilizer of a permutation group in $Sym(G)$ that contains a regular subgroup isomorphic to G . We prove that the groups $M_{3^n} = \langle a, b \mid a^{3^{n-1}} = b^3 = e, a^b = a^{3^{n-2}+1} \rangle$, where $n \geq 3$, are not Schur and the groups $\mathbb{Z}_3 \times \mathbb{Z}_{3^n}$, where $n \geq 1$, are Schur. Modulo previously obtained results, it follows that every non-cyclic Schur p -group is isomorphic to $\mathbb{Z}_3 \times \mathbb{Z}_3 \times \mathbb{Z}_3$ or $\mathbb{Z}_3 \times \mathbb{Z}_{3^n}$, $n \geq 1$, whenever p is an odd prime.

References

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